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Mohammad Ali Soleimani B.Sc., M.Sc., Ph.D, Ameneh Yaghoob Zadeh, Nasim Bahrami, Saeed Pahlevan Sharif Ph.D & Hamid Sharif Nia B.Sc., M.Sc., Ph.D

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Psychometric Evaluation of the Persian Version of the Templer's Death Anxiety Scale in Cancer Patients

Mohammad Ali Soleimani, B.Sc., M.Sc., Ph.D

Social Determinants of Health Research Center, Qazvin University of Medical Sciences, Qazvin, Iran

Ameneh Yaghoob Zadeh

Master's Student of Geriatric Nursing, Social Determinants of Health Research Center, Qazvin University of Medical Sciences, Qazvin, Iran

Nasim Bahrami

Social Determinants of Health Research Center, Qazvin University of Medical Sciences, Qazvin, Iran

Saeed Pahlevan Sharif, Ph.D

Lecturer, Taylor's Business School, Taylor's University, Selangor, Malaysia

Hamid Sharif Nia, B.Sc., M.Sc., Ph.D

Assistant Professor, School of Nursing and Midwifery Amol, Mazandaran University of Medical Sciences, Sari, Iran

Address correspondence to Hamid Sharif Nia, B.Sc., M.Sc., Ph.D, Assistant Professor, School of Nursing and Midwifery Amol, Mazandaran University of Medical Sciences, Sari, Iran. **Phone:** +98 28 33237268, **Fax:** +98 28 33237268. E-mail: pegadis@yahoo.com

Abstract

In this study, 398 Iranian cancer patients completed the 15-item Templer's Death Anxiety Scale (TDAS). Tests of internal consistency, principal components analysis, and confirmatory factor analysis were conducted to assess the internal consistency and factorial validity of the Persian TDAS. The Construct reliability statistic and average variance extracted were also calculated to measure construct reliability, convergent validity, and discriminant validity. Principal components analysis indicated a three component solution, which was generally supported in the confirmatory analysis However, acceptable cutoffs for construct reliability, convergent validity, and discriminant validity were not fulfilled for the three subscales that were derived from the principal component analysis. This study demonstrated both the advantages and potential limitations of using the TDAS with Persian-speaking cancer patients.

Keywords: cancer, principal component analysis, psychometric properties, reliability, validity

Confronting death is a formidable human concern that is impressed by personal experiences and socio-cultural beliefs (Nia, Lehto, Ebadi, & Peyrovi, 2016). This concern is rooted in individuals' past experiences, previous injuries, perceived threats, and negative life events (Nia, Ebadi, Lehto, & Peyrovi, 2015). Anxiety over death, simply called death anxiety (DA), includes thoughts, negative feelings, fears, emotions, and hopes related to end of life which emerge while experiencing major injuries (Brown, 2011). In fact, DA is a complex and multi-dimensional concept which cannot be explained easily. It is defined as the fear over ones' own or others' death. In other words, it consists of predicting and being afraid of one's own or significant others' death (Gire, 2014). DA is present in all cultures, and religions react to it differently (Adam B Cohen et al., 2005).

Individuals' attitudes towards death are affected by many factors including personal characteristics (such as age, gender, and health status), their belief system, intrinsic religiosity,

perceived threats, death education, death-related experiences, social context, and cultural, ethical and spiritual beliefs (Hunt & Rosenthal, 2000; Kawano, 2010; Rooda, Clements, & Jordan, 1998; Schiappa, Gregg, & Hewes, 2004; Zana, Szabó, & Hegedűs, 2009). DA is a characteristic which is acquired over life through social interactions. In other words, DA is not an innate and inherent quality; rather, it is an acquired characteristic which is affected by the immediate culture and context (Vernon, 1970). For instance, the results of a study conducted by Kawano (2010) on older Japanese revealed that DA is less prevalent in cultures in which the ashes of a burned dead corpus are scattered (Kawano, 2010). Moreover, Tavakoli and Ahmadzadeh noted that DA is more common in Western cultures compared to Eastern ones (Tavakoli & Ahmadzadeh, 2011). Some researches states that there is a significant relationship between DA and internal and external religious orientation, life satisfaction, and belief in life after death (Cicirelli, 1999; Adam B Cohen et al., 2005). Moreover, the results of studies showed that religiosity and spirituality has negative relationship with DA among Muslims (Al-Sabwah & Abdel-Khalek, 2006; Suhail & Akram, 2002).

DA is a major problem among patients with cancer In the study conducted by Khezri Bahreyni, Ravanipour, and Mirzaee (2015) the prevalence of DA among cancer patients was estimated to be about 71% (Khezri et al., 2015). Despite great medical advances, cancer is still among the most important health problems of the present century and is the second leading cause of death after cardiovascular disease (Khezri et al., 2015). It is considered by many to be a refractory condition and hence, when a definitive diagnosis of cancer is established, unrealistic fear and anxiety are expected (Mardani-Hamule & Sharak Vahed, 2010). Nonetheless, healthcare professionals mainly focus on managing patients' physical problems while patients are suffering from different DA-inducing psychological problems such as pain, agony, stress, depression, poor

quality of life, as well as fear over loneliness and loss of control (Krause, Rydall, Hales, Rodin, & Lo, 2015; Zana et al., 2009).

The impact of religion on DA has long been discussed. In one study, attitudes toward death (as a result of individuals` life experiences) could better predict the multiple dimensions of DA than factors such as demographic characteristics (R. A. Neimeyer, Wittkowski, & Moser, 2004). Belief in the life after death is another aspect of religious beliefs that are associated with DA. The results of a study suggested that religious people tend to have somewhat more positive attitudes and therefore less DA than non-religious people (Alvarado, Templer, Bresler, & Thomas-Dobson, 1995). However, the results of other studies have failed to show a significant relationship between religion and DA (F. Azaiza, P. Ron, M. Shoham, & I. Gigini, 2010; J.A. Thorson & Powell, 1989). Among Muslims, research has shown that religiosity has a negative relationship with DA (Al-Sabwah & Abdel-Khalek, 2006; Suhail & Akram, 2002).

The construct of DA is assessed by using different standardized instruments (Tavakoli & Ahmadzadeh, 2011) including the Templer's Death Anxiety Scale (Templer, 1970), the Revised Death Anxiety Scale (James A Thorson & Powell, 1992), the Collett-Lester Fear of Death Scale (Lester, 1994), the Threat Index (Rigdon, Epting, Neimeyer, & Krieger, 1979), the Death Attitude Profile-Revised (Paul, Reker, & Gesser, 1994), the Multidimensional Orientation toward Dying and Death Inventory (Wittkowski, 2001), the Multidimensional Fear of Death Scale (Robert A Neimeyer & Moore, 1994), and the Fear of Personal Death Scale (Lazar, 2006). Although The Templer's Death Anxiety Scale (TDAS) is widely used for DA assessment in Iran (Naderi & Roushani, 2011; Nia et al., 2014), the validity and reliability of the scale has not been assessed methodologically (McDonald & Hilgendorf, 1986; Naderi & Roushani, 2011).

TDAS was developed by Templer (1970) and contains fifteen items (Templer, 1970). Many studies in Iran have assessed DA and its effects on psychosocial well-being by using the TDAS (Salajegheh & Raghibi, 2014). Tavakoli et al. (2011) highlighted that researchers need to use valid and reliable instruments for evaluating DA (Tavakoli & Ahmadzadeh, 2011). According to the significant effects of socio-cultural factors on DA, it is crucial to develop culturally-adapted instruments for assessing DA (Depaola, Griffin, Young, & Neimeyer, 2003). The purpose of the present study was to evaluate the psychometric properties of the Persian version of the TDAS in a sample of Iranian cancer patients.

METHODS

This cross-sectional survey study was conducted in 2012. The survey contained items on patients' age, gender, employment, marriage, educational and socioeconomic status, cancer stage, and type of treatment. The TDAS was used to assess DA. Initially, written permission was obtained from the developer of the scale, i.e. Donald Templer, for using the TDAS. Then, the World Health Organization protocol was used to translate the TDAS into Persian (World Health Organization, 2009). We employed the forward-backward translation technique for translating the scale from English into Persian. Accordingly, two English-Persian translators were invited to independently translate the TDAS. An expert panel consisting of the authors of this paper and the two translators assessed and unified the two translations and produced a single Persian translation of TDAS. Thereafter, a Persian-English translator was asked to back-translate the Persian TDAS into English. This English version of the TDAS was sent to Dr. Templer. He confirmed the correctness of translations and confirmed the similarity of our English TDAS with the original English TDAS. The TDAS includes fifteen items which are scored on a five-point Likert scale from 1 (Completely disagree) to 5 (Completely agree). Consequently, the total score

of the scale ranges from 15 to 75. Lower scores show lower levels of DA. Items 2, 3, 5, 6, 7, and 15 are reversely scored (Templer, 1970).

FACE VALIDITY ASSESSMENT

The face validity of the Persian TDAS was assessed both qualitatively and quantitatively.

Qualitative Face Validity Assessment

For assessing the qualitative face validity of the Persian TDAS, ten cancer patients were invited to assess and comment on the appropriateness, difficulty, relevance, and ambiguity of the items. Moreover, the necessary time for completing the scale was determined in this step. The scale was amended according to patients' comments.

Quantitative Face Validity Assessment

The item impact technique was adopted for assessing the quantitative face validity of the Persian TDAS. Consequently, the same ten patients were asked to determine the importance of the items on a Likert-type scale from 1 (Not important) to 5 (Completely important). The item impact score of each item was calculated by using the following formula, Importance × Frequency (%). In this formula, frequency is equal to the number of patients who had ascribed a score of 4 or 5 to the intended item and importance was equal to scores 4 or 5. If the impact score of the item was greater than 1.5, the item was considered as suitable and it was maintained in the scale (Hajizadeh & Asghari, 2011; Maasoumi et al., 2013).

Content Validity Assessment

The content validity of the Persian TDAS was also assessed both qualitatively and quantitatively as explained below.

Qualitative Content Validity Assessment

In this step, the Persian TDAS was provided to fifteen experts (nine nursing doctorates, two psychiatrists, two clinical psychologists, and two oncologists) and they were asked to assess and comment on the wording, item allocation, and scaling of the items (Colton & Covert, 2007). They provided feedback on differences found in certain items between the English and the Persian version. Based on their comments, a final translation was created.

Quantitative Content Validity Assessment

The quantitative content validity of the scale was assessed through calculating Content Validity Ratio (CVR) and Content Validity Index (CVI) for the items. CVR reflects whether the items are essential or not. Accordingly, fifteen experts (that was mentioned above) were asked to rate the essentiality of the TDAS items on a three-point scale as follows: Not essential: 1; Useful but not essential: 2; and Essential: 3 (Cook & Beckman, 2006). The CVR of each item was calculated by using the following formula: $CVR = (n_e - (N/2)) / (N/2)$. In this formula, N and n_e are respectively equal to the total number of experts and the number of experts who score the intended item as 'Essential' 'Essential'. According to Lawshe (1975), when the number of panelists is fifteen, the minimum acceptable CVR is equal to .49 (Lawshe, 1975).

On the other hand, CVI shows the degree to which the items of the intended scale are simple, relevant, and clear. CVI can be calculated for each item of a scale (Item-level or I-CVI) and for the overall scale (Scale-level or S-CVI). Accordingly, we asked the same fifteen panelists to rate the simplicity, relevance, and clarity of the TDAS items on a four-point scale from 1 to 4. For instance, the four points for rating the relevance of the items were 'Not relevant, 'Somewhat relevant', 'Quite relevant', and 'Highly relevant' which were scored as 1, 2, 3, and 4, respectively. The I-CVI of each item was calculated by dividing the number of panelists who had rated that item as 3 or 4 by the total number of the panelists. Lynn, Surya Das, Hallquist, and

Williams (2006) noted that when the number of panelists is equal to fifteen, the items which acquire an I-CVI value of .79 or greater are considered as appropriate (Jay Lynn et al., 2006).

CONSTRUCT VALIDITY ASSESSMENT

To assess construct validity, the factor structure of the Persian TDAS was examined by conducting a principal components analysis followed by a varimax rotation with SPSS 22 (SPSS Inc., Chicago, IL, USA). The study of population consisted of all patients who had been referred to a major tertiary cancer institute located in Tehran, Iran, between September and December 2012 for cancer treatments such as surgical resection, radiotherapy, and chemotherapy. The patients' inclusion criteria were , being eligible for receiving surgery, radiotherapy or chemotherapy, being able to read and write Persian, and have no physical or psychiatric problems—other than cancer—which could restrict participation in the study (such as schizophrenia, post-traumatic stress disorder, dementia, major depressive disorder). The minimum sample size for conducting principal component analysis is equal to 5–10 times more than the number of the items of the intended instrument (Kellar & Kelvin, 2012). Consequently, 415 patients were recruited. Patients were asked to complete the Persian TDAS. The Kaiser-Meyer-Olkin (KMO) test and the Bartlett's test of sphericity were used to check the appropriateness of the study sample and the factor analysis model. The number of components was determined based on eigenvalues (eigenvalues of one or less should be ignored) and scree plot. Items with absolute loading values of .3 or greater were regarded as appropriate (Saggino & Kline, 1996).

The component structure obtained from the PCA was then examined using a confirmatory factor analysis (CFA) conducted with AMOS 19. Performing PCA followed by CFA has been recommended in psychometric studies (Kline, 2000). Although, ideally where

possible, a new data set should be used in the CFA analysis, assessing the model fit by conducting CFA on the same sample could provide useful information for subsequent CFA on new samples (Ho, Chan, & Ho, 2004; Martin & Savage-McGlynn, 2013; Van Prooijen & Van Der Kloot, 2001). In fact, if results obtained from PCA cannot be confirmed by CFA, most probably the results of PCA will not be confirmed in a different sample. Thus, it would be useful to examine to what extent the data fits to the model derived from PCA by performing CFA on the same sample (Ho et al., 2004; Van Prooijen & Van Der Kloot, 2001).

Jaccard and Wan (1996) have recommended that most common indexes of goodness a fitting model in CFA are $\chi 2$ goodness-of-fit index (CMIN), Root Mean Square Error of Approximation (RMSEA), Normed fit index (NFI), Adjusted Goodness of Fit Index (AGFI), TLI (Tucker-Lewis index), Parsimonious comparative fit index (PCFI), and the chi-square divided by the df value (CMIN/DF) (Jaccard & Wan, 1996). Cut-off criteria of model fit indices for latent variable models are shown in **Table 1** (Hooper, Coughlan, & Mullen, 2008; Schreiber, Nora, Stage, Barlow, & King, 2006).

Convergent and discriminant validity were assessed by estimating average variance extracted (AVE), maximum shared squared variance (MSV) and average shared square variance (ASV). To establish convergent validity, the AVE of constructs should exceed .50. For discriminant validity, both MSV and ASV should be less than AVE (A.B. Cohen et al., 2005).

RELIABILITY ASSESSMENT

The reliability of the Persian TDAS was first assessed through evaluating its internal consistency and calculating Cronbach's alpha. Alpha values of .7 or greater show satisfactory internal consistency (Jorritsma, de Vries, Dijkstra, Geertzen, & Reneman, 2012). Then, the construct reliability (CR) statistic for each the factors were assessed. CR values greater than .7

indicate good reliability and values between .6 and .7 can be accepted providing other indicators are good (Hair, Black, Babin, Anderson, & Tatham, 2006).

ETHICAL CONSIDERATIONS

The study was approved by the Ethics Committee of Qazvin University of Medical Sciences, Qazvin, Iran. Patients were informed about the study aims and procedures. Moreover, they were ensured that participation was voluntary and that it would not affect the course of their treatments. The confidentiality of patients' information was guaranteed. Informed consent was obtained from all participants.

RESULTS

In total, 415 patients were recruited to this study, among whom, 398 patients completed the study questionnaires. The response rate was 92%. The mean of participants' age was 51.7 ± 15.13 years. Most of the patients were female (51.5%), married (90.7%), and unemployed (71.1%). The duration of having suffered from cancer ranged from one to 360 months with a mean of 18.07 ± 30.51 (**Table 2**).

The impact score, CVR, and I-CVI values of all the fifteen items of the Persian TDAS were respectively greater than 1.5, .49 and .79 (**Table 3**) and hence, none of the items were excluded.

The KMO was .89, and the Bartlett's test of sphericity was significant ($p < .001$, 1870.30, $df = 66$) demonstrating that the sampling was adequate. PCA with varimax rotation was conducted to assess the underlying structure for the 15-items of the TDAS. The scree plot (**Figure 1**) indicated that three solutions were optimal. The varimax rotation indicated that (a) five items loaded on the first component which explained 26.24% of the post-rotation variance; (b) four items loaded on the second component with 25.88% of the post-rotation variance; (c)

and three items loaded on the third component with 11.80% of the post-rotation variance. After inspecting the items that clustered together in this analysis, these three components were labeled: (1) fear of death, (2) worry and stress, and (3) general concerns. The total cumulative variance explained by these three components was 63.93%. **Table 4** displays the items and loadings for the rotated components, with loadings less than .50 omitted to improve clarity.

Next, the component structure obtained with PCA was assessed with a CFA. According to the final model for the TDAS construction, there were correlations between the 1th and 5th items (between e1 and e2), the 3th and 6th items (between e3 and e4), and the 9th and 11th items (between e6 and e8). The final model, shown in **Figure 2**, was arrived after reviewing model modification indices for sources of model misfit. The fit of the final CFA was acceptable [χ^2 (48, N = 398) = 166.72, $p < .001$; AGFI = .885, PCFI = .683, PNFI = .662, TLI = .912, CMIN/DF = 3.47, RMSEA = .079).

As shown in **Table 5**, the AVE, MSV, and ASV values for the three tested constructs did not fulfill the requirements for convergent and discriminant validity. Specifically, AVE values were less than the .50 cutoff and MSV and ASV values were generally greater than AVE. Using Cronbach's alpha, reliability coefficients for 15 items was .81 which indicates a good reliability. However, the CR of components 1, 2, and 3 were .62, .68, and .60 respectively which did not indicate good construct reliability. This is because other indicators including AVE, MSV, and ASV did not fulfill the requirements.

DISCUSSION

The purpose of this study was to evaluate the psychometric properties of the Persian version of the TDAS in a sample of Iranian cancer patients. The findings demonstrated that the TDAS is a multidimensional instrument. The results of principal component analysis with

varimax rotation showed that the Persian TDAS had a three-component structure whose components were fear of death, worry and stress, and general concern about negative things. These three components had eigenvalues greater than 1. The highest and the lowest loads were related to components 1 (fear of death) and 3 (general concerns), respectively. The model that was tested in this study is somewhat simpler than those identified in prior studies. For example, Conte, Conte, Weiner, and Plutchik (1982) found that the four factors of the scale were fear of the unknown, fear of suffering, fear of loneliness, and fear of personal extinction (Conte et al., 1982). Tavakoli and Ahmadzadeh (2011) reported that the TDAS consisted of the five factors of absolute death anxiety, fear of pain, death-related thoughts, shortness of life, and fear over future (Tavakoli & Ahmadzadeh, 2011). Abdel-Khalek et al. (1993) and Levin (1990) also reported that the five factors of the scale were death-related thoughts, death-related pain, preoccupation with death, life shortness, and fear over future (A. Abdel-Khalek, Beshai, & Templer, 1993; Levin, 1989).

Fear of death was one of the components identified for the scale in the present study. Lo et al. (2011) also found that fear of death was one of the factors related to death anxiety among patients with end-stage cancers. They reported that 45% of cancer patients participating in their study had experienced fear of death (Lo et al., 2011). According to Azaiza et al. (2010), fear of death can be related to having limited knowledge about underlying disease (Faisal Azaiza, Pnina Ron, Meyrav Shoham, & Ibrahim Gigini, 2010). Besides, factors such as lack of fully-effective treatments for life-threatening conditions such as cancer, the inevitability of death, as well as negative feelings and images (such as seeing a dead corpus) can heighten patients' fear of death (Benton, Christopher, & Walter, 2007; Sherman, Norman, & McSherry, 2010).

Another component of the TDAS was worry and stress about death. Given the items loaded on this component, patients' worry and stress were related to rapid passage of time, shortness of life, imminent painful death, fear of the unknown, and despair. Lonetto et al. (1979) also found time awareness as one of the factors of death anxiety structure among Irish and Canadian students (Lonetto, Fleming, & Mercer, 1979). Another study showed that the concern and stress of the patients may be due to their attachment and having painful death (Lonetto et al., 1979). Tavakoli and Ahmadzadeh (2011) also reported that passage of time and life shortness were among the dimensions of death anxiety (Tavakoli & Ahmadzadeh, 2011). Such worry and stress can be related to environmental factors and unpredictable situations which affect death-related experiences (Floyd, Coulon, Yanez, & LaSota, 2004). Moreover, factors such as the severity of disease, witnessing others' death, and separation from beloved ones and things can heighten patients' death-related fear and anxiety (Nia et al., 2015).

The third component was general concern about negative things such as surgery or probable war. Emanuel, Fairclough, Wolfe, and Emanuel (2004) noted that talks about death are a general concern which can increase death anxiety among some cancer patients. Palliative care measures such as asking patients to articulate their concerns and perceptions can alleviate their anxiety and enhance their quality of life (Emanuel et al., 2004). Nia et al. (2014) also noted that thinking about the grave, burying, as well as postmortem disintegration, decay, and putrefying of a dead body can heighten patients' concerns (Nia et al., 2014).

According to the final model of TDAS, there is a correlation between measurement errors of items first and fifth (e1, e2), third and sixth (e3, e4), and ninth and eleventh (e6, e8). Monroe (2005) states that correlated measurement error occurs in situations in which variables have not been identified clearly or not measured directly, so it can affect item responses (Cicirelli, 1999).

Measurement errors may be caused by method effects such as self-reported measurement method. On the other hand, measurement errors can be the result of similar meaning or close to the meanings of words and phrases in both positive and negative statements (Harrington, 2008).

The present study used AVE, MSV, and ASV to assess the convergent and discriminant validity of the subscales derived from the three components that were identified. However, the results did not support the convergent and discriminant validity for each construct. The criterion of convergent validity was that the AVE is smaller than .5. Discriminant validity has not been fulfilled because MSV and ASV were larger than AVE. Stated differently, the measurement model did not show how measured items logically and systematically contributed to the unique latent constructs (Jiang, 2014).

The study findings also indicated that the Cronbach's alpha value for the overall TDAS was equal to .81, indicating an acceptable reliability. However, the CR values for components 1, 2, and 3 were not high enough. This finding may be attributed to the fact that the TDAS is a general DA assessment scale and hence, it does not specifically assess cancer-related DA. Templer (1970) reported a test-retest correlation coefficient and an internal consistency coefficient of respectively .83 and .76 for the scale (Templer, 1970). In a study conducted by Tavakoli and Ahmadzadeh (2011), these values were equal to .87 and .75, respectively (Tavakoli & Ahmadzadeh, 2011). Abdel-Khalek (1991) also reported that the split-half coefficients of the Arabic version of the scale among men and women were .57 and .78, respectively (A. M. Abdel-Khalek, 1991). Nia et al. (2014) assessed internal consistency for the 51-item DAS-Extended that showed Cronbach's $\alpha = .89$ (Nia et al., 2014). Many factors can affect the reliability of a measurement instrument. Cronbach's alpha has been associated with the number of items and length of the test on a tool (DeVellis, 2012).

One of the main tasks of the cultural system is to create a symbolic structure in order to discuss death, its occurrence, and importance in each society (Becker, 1997). Facing death and having anxiety about its unavoidable nature is a uniquely human psychological dilemma. Despite an increase in advanced technologies for improved health systems, patients' survival and access to treatment, death is a reality for health care providers. Although nurses and other end-of-life practitioners have a key role to play in assessing and managing DA in their the patients and their families, the findings of this study may not significantly guide their work other than to highlight the salience of DA among Iranian cancer patients, while also underscoring the need to potentially consider more cancer-specific concerns (e.g., fears about symptom progression or lack of functionality).

In our study, like other psychometric studies, there were several limitations. These limitations included: 1) the cross-sectional study design which did not allow for longitudinal assessment of test-retest reliability, 2) the use of self-report survey methods which could be subject to biased or false reporting, 3) a potentially non-representative sample, particularly with regard to educational limitations, which could hinder participants' ability to understand TDAS items, 4) the lack of other death and/or anxiety-related measures in the study that could be used for psychometric comparison with the TDAS, and 5) conducting PCA and CFA on the same sample that could limit the generalizability of the results and scope of the study. Thus, it is recommended to perform CFA on another independent samples in the future to examine factors stability.

CONCLUSION

Study findings suggest that the Persian TDAS has a three-component structure and acceptable reliability. However, values for discriminant and convergent validity of the scales

derived from these three TDAS components were not in the acceptable range. Thus, we may conclude that among Iranian cancer patients, this Persian translation of the TDAS appears to represents a reliable and relevant measure of death anxiety that tap into three related domains, namely fear of death, worry and stress, and general concerns. However, if these components represent unique constructs, the items of the Persian TDAS do not seem to be particularly well-suited for measuring them in a specific way, as values for construct reliability, convergent and discriminant validity were not in the acceptable range. Instead it may be that the Persian TDAS performs better as a general purpose measure of DA in this population, and other cancer-specific scales may be used to gauge more detailed concerns. Assessing and confirming the validity and the reliability of the scale in other patient populations is recommended as an area for further study.

References

Abdel-Khalek, A., Beshai, J. A., & Templer, D. I. (1993). The structure of templer's death anxiety scale among Egyptian students. *Psychological Reports*, *72*(3), 920–922. doi:10.2466/pr0.1993.72.3.920

Abdel-Khalek, A. M. (1991). Death anxiety among Lebanese samples. *Psychological Reports*, *68*(3), 924–926. doi:10.2466/pr0.1991.68.3.924

Ali Akbari Dehkordi, M., Oraki, M., & Barghi Irani, Z. (2011). Relation between religious orientation with anxiety about death, and alienation in aged peoples (seniors) in Tehran. *Social Psychology Research*, *1*(2), 140–159.

Al-Sabwah, M. N., & Abdel-Khalek, A. M. (2006). Religiosity and death distress in Arabic college students. *Death Studies*, *30*(4), 365–375. doi:10.1080/07481180600553435

Alvarado, K. A., Templer, D. I., Bresler, C., & Thomas-Dobson, S. (1995). The relationship of religious variables to death depression and death anxiety. *Journal of Clinical Psychology*, *51*(2), 202–204. doi:10.1002/1097-4679(199503)51:2<202::aid-jclp2270510209>3.0.co;2-m

Azaiza, F., Ron, P., Shoham, M., & Gigini, I. (2010). Death and dying anxiety among elderly Arab Muslims in Israel. *Death Studies*, *34*(4), 351–364. doi:10.1080/07481181003613941

Bahrami, N., Moradi, M., Soleimani, M. A., Kalantari, Z., & Hosseini, F. (2013). Death anxiety and its relationship with quality of life in women with cancer. *Iran Journal of Nursing*, *26*(82), 51–61.

Becker, E. (1997). *The denial of death*. Free Press.

Benton, J. P., Christopher, A. N., & Walter, M. I. (2007). Death anxiety as a function of aging anxiety. *Death Stud, 31*(4), 337–350. doi:10.1080/07481180601187100

Brown, A. G. (2011). *An examination of the relationship between death anxiety, optimism, depression, and anxiety*. Texas Tech University.

Cicirelli, V. G. (1999). Personality and demographic factors in older adults' fear of death. *The Gerontologist, 39*(5), 569–579. doi:10.1093/geront/39.5.569

Cohen, A. B., Pierce, J. D., Chambers, J., Meade, R., Gorvine, B. J., & Koenig, H. G. (2005). Intrinsic and extrinsic religiosity, belief in the afterlife, death anxiety, and life satisfaction in young Catholics and Protestants. *Journal of Research in Personality, 39*(3), 307–324. doi:10.1016/j.jrp.2004.02.005

Colton, D., & Covert, R. W. (2007). *Designing and constructing instruments for social research and evaluation*. John Wiley & Sons.

Conte, H. R., Weiner, M. B., & Plutchik, R. (1982). Measuring death anxiety: Conceptual, psychometric, and factor-analytic aspects. *Journal of Personality and Social Psychology, 43*(4), 775–785. doi:10.1037//0022-3514.43.4.775

Cook, D. A., & Beckman, T. J. (2006). Current concepts in validity and reliability for psychometric instruments: Theory and application. *The American Journal of Medicine, 119*(2), 166.e7–166.e16. doi:10.1016/j.amjmed.2005.10.036

Depaola, S. J., Griffin, M., Young, J. R., & Neimeyer, R. A. (2003). Death anxiety and attitudes toward the elderly among older adults: The role of gender and ethnicity. *Death Studies, 27*(4), 335–354. doi:10.1080/07481180302904

DeVellis, R. F. (2012). *Scale development: Theory and applications.* SAGE Publications.

Emanuel, E. J., Fairclough, D. L., Wolfe, P., & Emanuel, L. L. (2004). Talking with terminally ill patients and their caregivers about death, dying, and bereavement: Is it stressful? Is it helpful? *Archives of Internal Medicine, 164*(18), 1999–2004. doi:10.1001/archinte.164.18.1999

Floyd, M., Coulon, C., Yanez, A. P., & LaSota, M. T. (2004). The existential effects of traumatic experiences: A survey of young adults. *Death Studies, 29*(1), 55–63. doi:10.1080/07481180490483463

Gire, J. (2014). How death imitates life: Cultural influences on conceptions of death and dying. *Online Readings in Psychology and Culture, 6*(2), 3–25. doi:10.9707/2307-0919.1120

Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L. (2006). *Multivariate data analysis* (Vol. 6). Upper Saddle River, NJ: Pearson Prentice Hall.

Hajizadeh, E., & Asghari, M. (2011). *Statistical methods and analyses in health and biosciences a research methodological approach*. Tehran: Jahade Daneshgahi Publications.

Harrington, D. (2008). *Confirmatory factor analysis*. USA: Oxford University Press.

Ho, S. M. Y., Chan, C. L. W., & Ho, R. T. H. (2004). Posttraumatic growth in Chinese cancer survivors. *Psycho-Oncology, 13*(6), 377–389. doi:10.1002/pon.758

Hooper, D., Coughlan, J., & Mullen, M. (2008). Structural equation modelling: Guidelines for determining model fit. *Articles*, 2.

Hunt, B., & Rosenthal, D. A. (2000). Rehabilitation counselors' experiences with client death and death anxiety. *The Journal of Rehabilitation, 66*(4), 44–50.

Jaccard, J., & Wan, C. K. (1996). *LISREL approaches to interaction effects in multiple regression*. Sage.

Jiang, W. (2014). *Business partnerships and organizational performance: The role of resources and capabilities*. Springer Berlin Heidelberg.

Jorritsma, W., de Vries, G. E., Dijkstra, P. U., Geertzen, J. H. B., & Reneman, M. F. (2012). Neck pain and disability scale and neck disability index: Validity of Dutch language versions. *European Spine Journal, 21*(1), 93–100. doi:10.1007/s00586-011-1920-5

Kawano, S. (2010). A sociocultural analysis of death anxiety among older Japanese urbanites in a citizens' movement. *OMEGA - Journal of Death and Dying, 62*(4), 369–386. doi:10.2190/om.62.4.d

Kellar, S. P., & Kelvin, E. A. (2012). *Munro's statistical methods for health care research*. Wolters Kluwer Health/Lippincott Williams & Wilkins.

Khezri, L., Bahreyni, M., Ravanipour, M., & Mirzaee, K. (2015). The relationship between spiritual wellbeing and depression or death anxiety in cancer patients in Bushehr 2015. *Nursing of the Vulnerables, 2*(2), 15–28.

Kline, P. (2000). *A psychometrics primer*. London: Free Assn Books.

Krause, S., Rydall, A., Hales, S., Rodin, G., & Lo, C. (2015). Initial validation of the death and dying distress scale for the assessment of death anxiety in patients with advanced cancer. *Journal of Pain and Symptom Management, 49*(1), 126–134. doi:10.1016/j.jpainsymman.2014.04.012

Lawshe, C. H. (1975). A qualitative approach to content validity. *Personnel Psychology, 25*, 563–575. doi:10.1111/j.1744-6570.1975.tb01393.x

Lazar, A. (2006). Fear of personal death as a predictor of motivation for religious behavior. *Review of Religious Research, 48*(2), 179–189.

Lester, D. (1994). *Death anxiety handbook.* Washington, DC: Taylor and Francis.

Levin, R. (1989). A reexamination of the dimensionality of death anxiety. *OMEGA–Journal of Death and Dying, 20*(4), 341–349. doi:10.2190/y7r2-9kjc-r943-kggq

Lo, C., Hales, S., Zimmermann, C., Gagliese, L., Rydall, A., & Rodin, G. (2011). Measuring death-related anxiety in advanced cancer: Preliminary psychometrics of the death and dying distress scale. *Journal of Pediatric Hematology/oncology, 33*(1), S140–S145. doi:10.1097/mph.0b013e318230e1fd

Lonetto, R., Fleming, S., & Mercer, G. W. (1979). The structure of death anxiety: A factor analytic study. *Journal of Personality Assessment, 43*(4), 388–392. doi:10.1207/s15327752jpa4304_9

Lynn, S. J., Surya Das, L. S., Hallquist, M. N., & Williams, J. C. (2006). Mindfulness, acceptance, and hypnosis: Cognitive and clinical perspectives. *International Journal of Clinical and Experimental Hypnosis, 54*(2), 143–166. doi:10.1080/00207140500528240

Maasoumi, R., Lamyian, M., Montazeri, A., Azin, S., Aguilar-Vafaie, M. E., & Hajizadeh, E. (2013). The sexual quality of life-female (SQOL-F) questionnaire: Translation and psychometric properties of the Iranian version. *Reproductive Health, 10*(1), 25–31. doi:10.1186/1742-4755-10-25

Mardani-Hamule, M., & Sharak Vahed, A. (2010). Relationship between mental health and quality of life cancer patient. *Journal of Shahid Sadoughi University of Medical Science, 18*(2), 111–117.

Martin, C. R., & Savage-McGlynn, E. (2013). A 'good practice' guide for the reporting of design and analysis for psychometric evaluation. *Journal of Reproductive and Infant Psychology, 31*(5), 449–455. doi:10.1080/02646838.2013.835036

McDonald, R. T., & Hilgendorf, W. A. (1986). Death imagery and death anxiety. *Journal of Clinical Psychology, 42*(1), 87–91. doi:10.1002/1097-4679(198601)42:1<87::aid-jclp2270420113>3.0.co;2-s

Naderi, F., & Roushani, K. (2011). The relations between spiritual intelligence, social intelligence and death anxiety in Ahwaz womanseniles. *Journal of Women and Culture, 2*(6), 55–67.

Neimeyer, R. A., & Moore, M. K. (1994). Validity and reliability of the multidimensional fear of death scale. *Death anxiety handbook: Research, instrumentation, and application*, 103–119.

Neimeyer, R. A., Wittkowski, J., & Moser, R. P. (2004). Psychological research on death attitudes: An overview and evaluation. *Death Studies, 28*(4), 309–340. doi:10.1080/07481180490432324

Nia, H. S., Ebadi, A., Lehto, R. H., Mousavi, B., Peyrovi, H., & Chan, Y. H. (2014). Reliability and validity of the Persian version of templer death anxiety scale-extended in veterans of Iran-Iraq warfare. *Iranian Journal Psychiatry Behavioral Sciences, 8*(4), 29–37.

Nia, H. S., Ebadi, A., Lehto, R. H., & Peyrovi, H. (2015). The experience of death anxiety in Iranian war veterans: A phenomenology study. *Death Studies, 39*(1–5), 281–287. doi:10.1080/07481187.2014.991956

Nia, H. S., Lehto, R. H., Ebadi, A., & Peyrovi, H. (2016). Death anxiety among nurses and health care professionals: A review article. *International Journal of Community Based Nursing and Midwifery, 4*(1), 7–10.

Nyatunga, B., & de Vocht, H. (2006). Towards a definition of death anxiety. *International Journal of Palliative Nursing, 12*(9), 410–413. doi:10.12968/ijpn.2006.12.9.21868

Paul, T. W., Reker, G. T., & Gesser, G. (1994). Death attitude profile-revised: A multidimensional measure of attitudes toward death. *Death anxiety handbook: Research, instrumentation, and application*, 121.

Rigdon, M. A., Epting, F. R., Neimeyer, R. A., & Krieger, S. R. (1979). The threat index: A research report. *Death Education, 3*(3), 245–270. doi:10.1080/07481187908252956

Rooda, L. A., Clements, R., & Jordan, M. L. (1998). *Nurses' attitudes toward death and caring for dying patients.* Paper presented at the Oncology Nursing Forum.

Sadeghi, H., Saeedi, M., Rahzani, K., & Esfandiary, A. (2015). The relationship between social support and death anxiety in hemodialysis patients. *Iranian Journal of Psychiatric Nursing, 2*(4), 36–48.

Saggino, A., & Kline, P. (1996). Item factor analysis of the Italian version of the death anxiety scale. *Journal of Clinical Psychology, 52*(3), 329–333. doi:10.1002/(sici)1097-4679(199605)52:3<329::aid-jclp11>3.0.co;2-k

Salajegheh, S., & Raghibi, M. (2014). The effect of combined therapy of spiritual- cognitive group therapy on death anxiety in patient with cancer. *Journal of Shahid Sadoughi University of Medical Sciences, 22*(2), 1130–1139.

Schiappa, E., Gregg, P. B., & Hewes, D. E. (2004). Can a television series change attitudes about death? A study of college students and six feet under. *Death Studies, 28*(5), 459–474. doi:10.1080/07481180490437581

Schreiber, J. B., Nora, A., Stage, F. K., Barlow, E. A., & King, J. (2006). Reporting structural equation modeling and confirmatory factor analysis results: A review. *The Journal of educational research, 99*(6), 323–338. doi:10.3200/joer.99.6.323-338

Sherman, D. W., Norman, R., & McSherry, C. B. (2010). A comparison of death anxiety and quality of life of patients with advanced cancer or AIDS and their family caregivers. *Journal of the Association of Nurses in AIDS Care, 21*(2), 99–112. doi:10.1016/j.jana.2009.07.007

Solomon, S., Greenberg, J., & Pyszczynski, T. (1991). Terror management theory of self-esteem.
Suhail, K., & Akram, S. (2002). Correlates of death anxiety in Pakistan. *Death Studies, 26*(1), 39–50. doi:10.1080/07481180210146
Tavakoli, M. A., & Ahmadzadeh, B. (2011). Investigation of validity and reliability of templer death anxiety scale. *Thought & Behavior in Clinical Psychology, 6*(21), 72–80.
Templer, D. I. (1970). The construction and validation of a death anxiety scale. *The Journal of General psychology, 82*(2), 165–177. doi:10.1080/00221309.1970.9920634
Thorson, J. A., & Powell, F. C. (1989). Death anxiety and religion in an older male sample. *Psychological Reports, 64*, 985–986. doi:10.2466/pr0.1989.64.3.985
Thorson, J. A., & Powell, F. C. (1992). A revised death anxiety scale. *Death Studies, 16*(6), 507–521. doi:10.1080/07481189208252595
Van Prooijen, J. W., & Van Der Kloot, W. A. (2001). Confirmatory analysis of exploratively obtained factor structures. *Educational and Psychological Measurement, 61*(5), 777–792. doi:10.1177/00131640121971518
Vernon, G. M. (1970). *Sociology of death: An analysis of death-related behavior*. Ronald Press Co.
Weiner, I. B., Freedheim, D. K., Graham, J. R., Schinka, J. A., & Velicer, W. F. (2003). *Handbook of Psychology, Assessment Psychology*. Wiley.
Wittkowski, J. (2001). The construction of the multidimensional orientation toward dying and death inventory (MODDI-F). *Death Studies, 25*(6), 479–495. doi:10.1080/07481180126858
World Health Organization. (2009). *Process of translation and adaptation of instruments*. Retrieved from http://www.who.int/substance_abuse/research_tools/translation/en
Zana, Á., Szabó, G., & Hegedűs, K. (2009). Attitudes toward death in Hungary using the multidimensional fear of death scale. *Clinical and Experimental Medical Journal, 3*(2), 327–335. doi:10.1556/cemed.3.2009.2.12

Table 1. Cutoff criteria for several fit indexes

Indexes	Acceptable fit
Chi-squared *P*-value	<.5
PCFI (Parsimony normed comparative fit index)	
PNFI (Parsimonious normed fit index)	
AGFI (Adjusted goodness of fit index)	<.08
TLI (Tucker-Lewis index)	<.9
RMSEA (Root mean square error of approximation)	Good <.08, moderate < 08 to .1
CMIN/DF (Minimum discrepancy function by degrees of freedom divided)	Good < 3, acceptable < 5

Table 2. Demographic characteristics of the study participants

Demographic characteristics		Number (%)
Sex	Male	193(48.5)
	Female	205(51.5)
Marriage	Single	31(7.8)
	Married	361(90.7)
	Widowed/ divorced	6(1.5)
Employment	Yes	115(28.9)
	No	283(71.1)
Educational status	No formal education	35(9)
	Primary	74(18.6)
	Intermediate	69(17.3)
	High School	128(32.1)
	Collegiate	92(23.0)
Economic Status	Poor	123(30.9)
	Average	251(63.0)
	Good	24 (6.1)
Main source of income	Personal	157(39.6)
	Family and children	230(57.7)
	Pension from the government	11(2.8)
Stage of Cancer	I	140(35.2)
	II	110(27.6)
	III	66(16.6)

	IV	82(20.6)
Type of treatment	Treatment undecided or not started	123(30.9)
	Chemo therapy	157 (39.5)
	Radiation therapy	30(7.5)
	Combination (Chemo and Radiation) therapies	70(17.6)
	Surgery	18(4.5)
Death experiences	Yes	4(1)
	No	394(99)

Table 3. The CVR and I-CVI for the TDAS items

Items	CVI			CVR
	Simplicity (1–4)	Relevancy (1–4)	Clarity (1–4)	Essential (1–3)
I am too afraid to die	.86	.8	.93	.86
The thought of death seldom enters my mind	.86	1	.8	1
It doesn't make me nervous when people talk about death	.86	.93	.8	.86
I dread to think about being compelled to have an operation	.86	1	.93	1
I am not at all afraid to die	1	1	1	1
I am not particularly afraid of getting cancer	.86	.93	.8	1
The thought of death never bothers me	.86	.8	.8	.86
I am often distressed by the way time flies so rapidly	.93	1	.93	1
I fear dying a painful death	.93	1	.8	.86
The subject of life after death troubles me greatly	.86	1	.93	1
I am really scared of having a heart attack	.86	1	.8	.86

I often think about how short life really is	1	1	1	1
I shudder when I hear people talking about a World War III	.86	1	.86	1
The sight of a dead body is horrifying to me	.86	.93	.86	1
I feel that the future holds nothing for me to fear	.86	1	.8	1

Table 4. Principal component loadings of items in the DAS with three components

Components	Items	loading	h2	% of variance	Eigen values
1	I am very much afraid to die	.827	.741	26.24	5.00
	I am not at all afraid to die	–.802	.681		
	It doesn't make me nervous when people talk about death	.737	.561		
	I am not particularly afraid of getting cancer	.617	.551		
	The thought of death never bothers me	.596	.665		
2	I fear dying a painful death	.795	.668	25.88	1.65
	The subject of life after death troubles me greatly	.752	.663		
	I am really scared of having a heart attack	.731	.593		
	I feel that the future holds nothing for me to	.667	.611		

	fear				
3	I often think about how short life really is	.494	.655	11.80	1.01
	I shudder when I hear people talking about a World War III	.797	.712		
	I dread to think about having to have an operation	.601	.595		

h^2: Communalities

Table 5. Convergent and divergent validity of TDAS

Component	AVE	MSV	ASV
1	.44	.56	.42
2	.48	.64	.60
3	.36	.64	.46

Figure 1. The scree plot for TDAS.

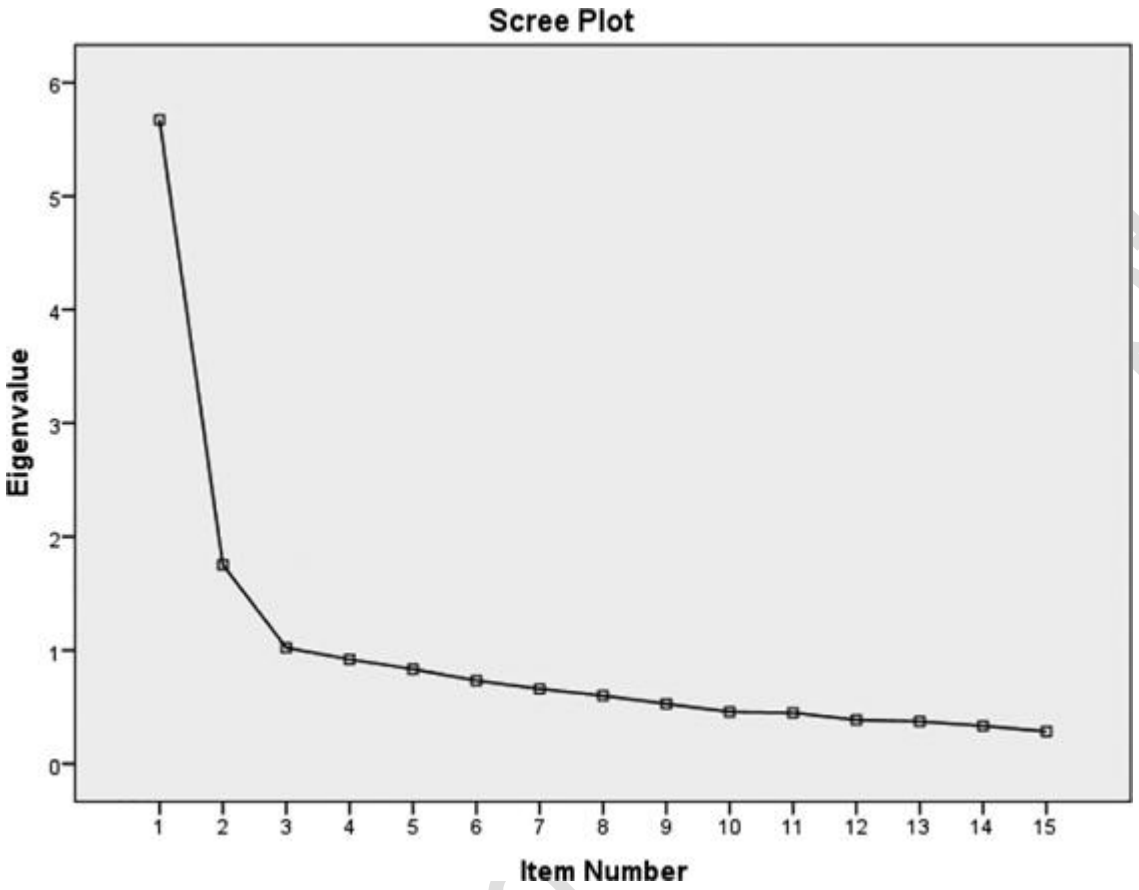
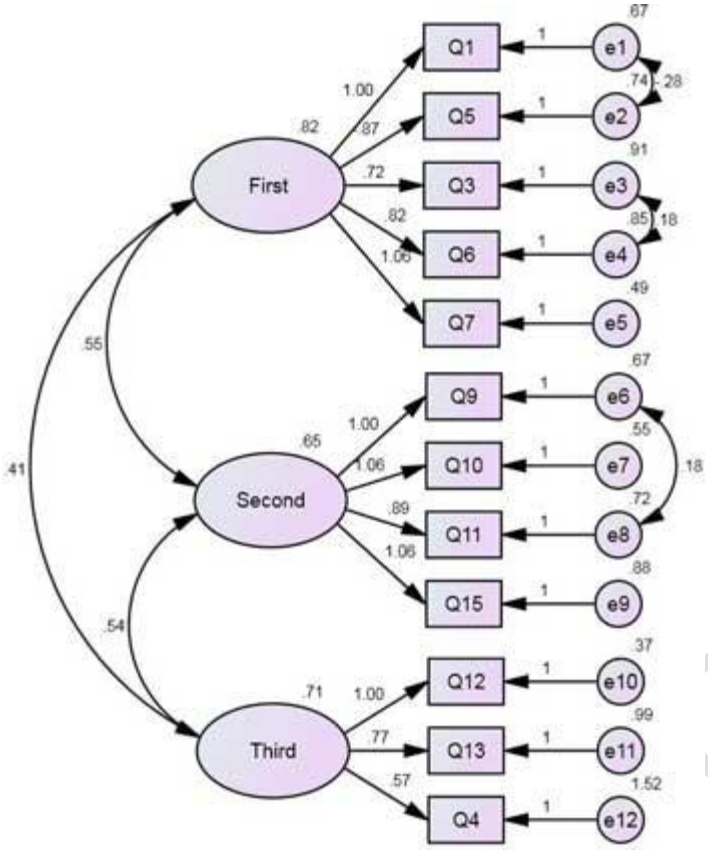


Figure 2. The final structural model of DAS among cancer patients.



Appendix

نسخه فارسی مقیاس 15 آیتم اضطراب مرگ تمپلر

1. من خیلی از مردن می‌ترسم.

کاملاً مخالفم (1) مخالفم (2) نظری ندارم (3) موافقم (4) کاملاً موافقم (5)

2. فکر مرگ به ندرت به ذهن من خطور می‌کند.

کاملاً موافقم (1) موافقم (2) نظری ندارم (3) مخالفم (4) کاملاً مخالفم (5)

3. صحبت کردن دیگران در مورد مرگ من را عصبی و آشفته نمی‌کند.

کاملاً موافقم (1) موافقم (2) نظری ندارم (3) مخالفم (4) کاملاً مخالفم (5)

4. فکر داشتن یک عمل جراحی من را می‌ترساند.

کاملاً مخالفم (1) مخالفم (2) نظری ندارم (3) موافقم (4) کاملاً موافقم (5)

5. اصلاً از مردن نمی‌ترسم.

کاملاً موافقم (1) مخالفم (2) نظری ندارم (3) موافقم (4) کاملاً مخالفم (5)

6. خیلی از ابتلا به سرطان نمی‌ترسم.

کاملاً موافقم (1) موافقم (2) نظری ندارم (3) مخالفم (4) کاملاً مخالفم (5)

7. فکر کردن در مورد مرگ هرگز من را نگران نمی‌کند.

کاملاً موافقم (1) موافقم (2) نظری ندارم (3) مخالفم (4) کاملاً مخالفم (5)

8. اغلب از گذشت سریع زمان مضطرب می‌شوم.

کاملاً مخالفم (1) مخالفم (2) نظری ندارم (3) موافقم (4) کاملاً موافقم (5)

9. از اینکه مرگ دردناکی داشته باشم، می‌ترسم.

کاملاً مخالفم (1) مخالفم (2) نظری ندارم (3) موافقم (4) کاملاً موافقم (5)

10. تصور زندگی بعد از مرگ به شدت مرا نگران می‌سازد.

کاملاً مخالفم (1) مخالفم (2) نظری ندارم (3) موافقم (4) کاملاً موافقم (5)

11. واقعاً از ابتلا به حمله قلبی می‌ترسم.

کاملاً مخالفم (1) مخالفم (2) نظری ندارم (3) موافقم (4) کاملاً موافقم (5)

12. اغلب فکر می‌کنم که واقعاً چقدر زندگی کوتاه است.

کاملاً مخالفم (1) مخالفم (2) نظری ندارم (3) موافقم (4) کاملاً موافقم (5)

13. از شنیدن حرفهای مردم در مورد جنگ مشمئز (آزرده خاطر) می‌شوم.

کاملاً مخالفم (1) مخالفم (2) نظری ندارم (3) موافقم (4) کاملاً موافقم (5)

14. دیدن بدن یک مرده (جسد) مرا دچار وحشت می‌کند.

کاملاً مخالفم (1) مخالفم (2) نظری ندارم (3) موافقم (4) کاملاً موافقم (5)

15. احساس می‌کنم که در آینده چیزی نیست که مرا بترساند.

کاملاً موافقم (1) موافقم (2) نظری ندارم (3) مخالفم (4) کاملاً مخالفم (5)